



APPLICATION NOTICE

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EQUIPMENT:	Gates ONE, Gates TWO, Gates FIVE	BULLETIN NO:	APN-159-WCF
		Part No:	7734450003
		DATE:	1 Dec 2014
UNIT(S) AFFECTED:	all	ECN NO:	n/a
		PAGES:	2
PURPOSE:	Power Supply Capacitors, Replacement Electrolytic Part Numbers		

Review the following documentation thoroughly prior to implementing.

ATTENTION:
The Following Procedure Must Be Carried Out By An Electrically Competent Person Using Appropriate ESD and Soldering Procedures, "Electrically Competent Person" as defined in the IEC-215 Safety Standard

Purpose: Advisory information pertaining to Electrolytic filter capacitors, list some common symptoms and to provide part numbers for replacements.

The filter capacitors utilized during factory assembly are selected for their ability to handle AC ripple currents and the increased ambient temperatures induced by AC ripple.

AC ripple produces internal heating within the capacitor. This heating is the cause of aging in the capacitor and the resulting decrease of capacitance. As this occurs, the filtered DC voltage has increased ripple and spurious noise or hash on the DC supply rails. This can induce other seemingly unrelated problems into the transmitter that may be difficult to locate.

Other than heating, there are additional factors that may affect the life of the capacitor. Leaky seals may allow the electrolytic fluid to vent off or evaporate. Extreme temperature fluctuations or extreme low temperatures may affect the seals causing them to vent. Large transient voltages or high operating voltages can contribute to a shortened operational life.

Two of the more common power supply capacitor issues are on the Oscillator and PDM amplifiers:

1 - Bad capacitors on the oscillator are the most common failure in the Gates ONE TWO and FIVE. See the **Oscillator U3 voltage check** procedure later in this application note. Symptoms can include; low RF DRIVE (level on multimeter), RF Underdrive faults or forward power of transmitter drops to lower power setting, failure of PA Amplifier FETs and failure to meet NRSC performance specifications.

2 - Bad PDM Amplifier and Supply Capacitors; A19C1 though A19C4, quantity varies with model, are the most common cause of spurious RF going to the antenna and being broadcast at 60kHz above and below carrier frequency. These spurs have an FCC maximum level, referenced to carrier, as defined by NRSC publications.

Oscillator U3 voltage check:

Tools required: Quality (RMS reading) Digital Voltmeter, PC board soldering equipment and basic hand tools.

Verify by measuring the DC supply voltage on the oscillator that operates the final amplifier. This voltage determines the RF level going to the IPA. The output of U3 can be checked by connecting a multimeter plus lead on the top end of resistor R26, physically between Q3 and CR6, negative test lead to chassis ground. Verify to be nearly 16VDC. This voltage erratically drooping down is the typical symptom of bad capacitors on the oscillator board.

Replace the radial lead electrolytic capacitors, for immediate symptom relief, on the A16 oscillator board: C017 C018 10uF and C009 C012 3.3uF (part numbers on next page). A20C1 and A20C2 most likely also need replacement.

Parts list:

Chassis Capacitors (also see Bulletin AM-579)

PDM Amplifier and Supply Capacitors		
	5240341000 CAP 5100uF 350WVDC	5240178000 CAP 860uF 450WVDC
Gates ONE	1 EA, A19C5	2 EA, A19C1 A19C3
Gates TWO	3 EA, A19C5 A19C1 A19C3	0 EA
Gates FIVE 3-Phase	5 EA, A19C5 A19C1 A19C3 A19C2 A19C4	0 EA
Gates FIVE 1-Phase	6 EA, A19C5 A19C1 A19C3 A19C2 A19C4 A19C6	0 EA

+/- 20V Power Supplies:

5240313000 2 EA CAP 25,000UF 40VDC A20C1 A20C2

IPA Power Supply:

5240346000 1 EA CAP, 7400UF 200WVDC A20C3

Circuit Board Capacitors:

Oscillator A16:

5220548000 2 EA . . CAP 10UF 50V 20% . . .C017 C018

5220572000 2 EA . . CAP 3.3UF 50V 20% . . .C009 C012

PDM Generator A15:

5220572000 10 EA CAP 3.3UF 50V 20% C35 C42 C45 C49 C50 C52 C61 C64 C68 C69

5220573000 4 EA CAP 47UF 63V 20% C74 C75 C76 C77

PDM Amplifiers A6 A7

5220548000 2 EA CAP 10UF 50V 20% C1 in two locations
2 more for Gates FIVE

Controller A12:

5220548000 4 EA CAP 10UF 50V 20% C61 C62 C67 C68

Interface A24:

5220391000 1 EA CAP 1000UF 16V 20% C18

Air Flow A20A1:

5220528000 1 EA CAP 470UF 63V 20% C6

5220566000 1 EA CAP 100UF 63V 20% C5

5220573000 1 EA CAP 47UF 63V 20% C7

Gates FIVE 3-phase A19K3 Phase Monitor ... choose part number based on 3-phase line-to-line voltage

7400495000 1 EA PHASE MONITOR 3-wire 208 - 240 VAC Line to Line

7400837000 1 EA MON PH 350-440V 3PH 4-wire 380 WYE for example

Service Bulletins are also available on the GatesAir Web Site at <http://www.gatesair.com>

Should you have any questions relating to this bulletin, please contact:

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